3. TECHNICAL DESCRIPTION

The glovebox excavator project provides a safe, simple approach to Pit 9 waste zone material removal needs, and achieves this at a lower cost and within a shorter schedule than other proposed methods.

Glovebox Excavator Method

- Provides a simple approach
- Maximizes use of off-the-shelf technology
- Reduces cost by using short-term or one-time-use equipment and design
- Maximizes worker safety by separation of workers from waste zone material.

The glovebox excavator method design allows all waste zone material retrieval, sampling, and packaging to be conducted inside a contaminant confinement by personnel outside the confinement, as shown in Figure 3-1. The confinement (with a filtered exhaust system) protects both workers and the public, and consists of a Weather Enclosure Structure (WES) enclosing the contaminant confinement (Retrieval Confinement Structure [RCS]). The WES is anchored to a Facility Floor Structure (FFS), which supports the equipment. Waste is processed in the Packaging Glovebox System (PGS).

The design concept is simple and meets the project Technical and Functional Requirements. The key components of the design (excavator, confinement, and gloveboxes) use standard commercial products and fabrication techniques. For example, the excavator is a standard backhoe modified to seal to the confinement and equipped with enhanced television viewing. It is operated in the normal manner. This system is much simpler to design, procure, construct, and operate than a specially built unit. Data management has been kept simple, as well, by using manual and existing INEEL systems.

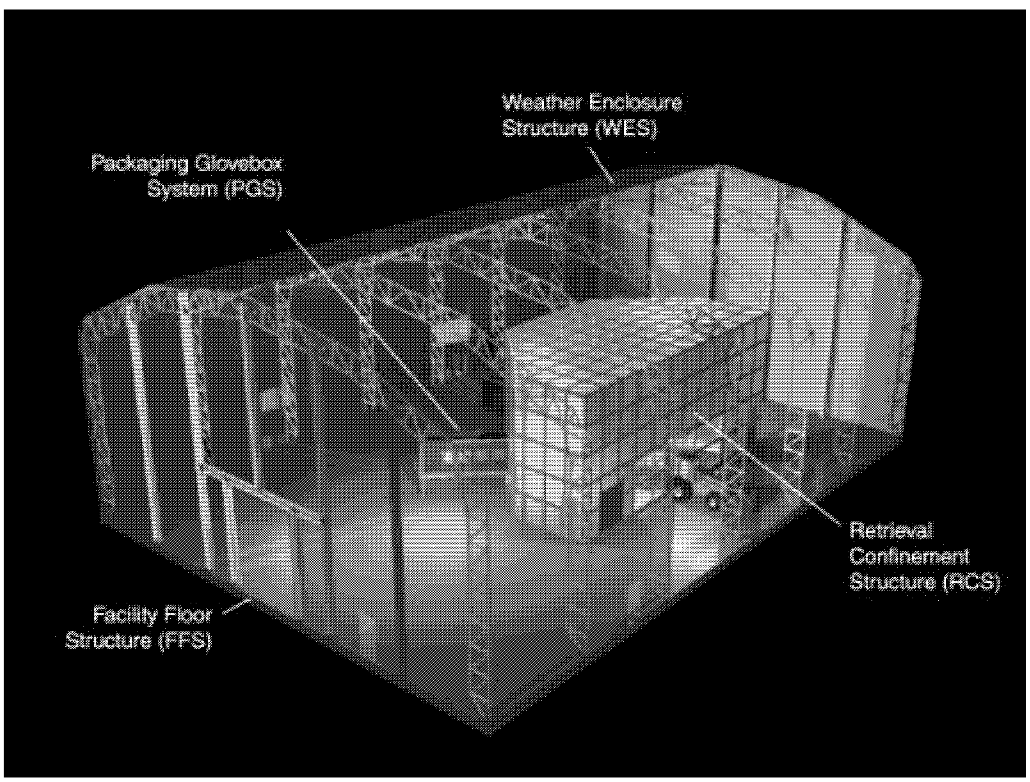

Figure 3-1. Glovebox excavator method design integrates proven, deployed, engineering principles.

The design performance requirements for the glovebox excavator method facility are met with standard commercial equipment, fabrication techniques, and construction methods. In addition, the glovebox excavator method facility uses equipment, materials, and design features suitable for short-term and one-time use, which reduces facility cost. Key components can be delivered earlier and construction is simpler, all of which contributes to a short project schedule. The following sections describe the unique design, its key features, and their benefits. The conceptual design drawings are included in Appendix C.

3.1 Process Description

The major process goals of the Glovebox Excavator Method project are to:

- Retrieve waste zone material rapidly and cost-effectively
- Prevent cross-contamination of waste zone material in overburden soil
- Dispose of all materials excavated by the project to prevent creating legacy waste
- Return the facility to a safe condition before shutdown.

Section 3.1 summarizes the process plans. Process logic diagrams further detail the process sequence and can be found in Appendix D. Process flow diagrams identify material flow and quantities and are found in the Appendix C, sheets T5, T6, and T7.

Glovebox Excavator Method Highlights

- Retrieve, characterize for safe storage, and disposition 75–125 yd^3 of waste zone material
- Sample underburden and characterize for TRU and contaminants of concern (COC)
- Dispose of overburden by returning to the pit
- Return excavation area and confinement buildings to safe condition before shutdown
- Minimize period of operation

The process is being developed ahead of system design, to guide the design effort. However, the process and design efforts are iterative, and the process will evolve as needed to ensure compatibility with the design. The process development is about 80% mature at the conceptual design phase.

There are four major processes (see Figure 3-2):

1. Remove overburden
2. Retrieve waste zone material
3. Close pit
4. Sample waste zone material.

Overburden removal includes activities from retrieving overburden soil through temporarily staging the material outside, pending eventual return to the pit after waste zone material retrieval is complete. Overburden removal is completed before retrieving waste zone material to prevent contaminating overburden soil. Retrieval starts with waste zone material excavation, proceeding through packaging and interim storage. Ultimately, the material disposition strategy is to have the AMWTF prepare the waste zone material for shipment to the Waste Isolation Pilot Plant (WIPP). After waste zone material retrieval is complete, the pit closure phase collects samples of underburden material for characterization, stabilizes and fills the pit volume with overburden soil followed by weak grout, then places the facility in a safe shutdown condition. Samples collected during waste zone material processing and underburden sampling are handled using the sample process, including storage, shipping, and analysis.

Operations consist of all tasks performed to excavate, retrieve, sample, package, handle, assay, and store all of the soil and waste zone material to be removed from the designated portion of OU 7-10. These tasks are organized into the four processes previously discussed to define the sequences and synchronization, as shown in Figure 3-2. Once operations have begun, they continue nonstop, around the clock, until they are completed. This strategy minimizes risk by minimizing exposure. Therefore, operations run 24 hours per day using four crews, working shifts of 12-hour days, 4 days on and 4 days off. The process retrieves 75–125 yd^3 of waste zone material and interstitial soil, resulting in roughly 300–400 filled drums. The actual quantity of material generated by the project depends on the angle of repose that the waste zone material sustains. Table 3-1 quantifies the types and ranges of materials generated by the Glovebox Excavator Method Project, based on a 45- to 60 degree angle of repose.

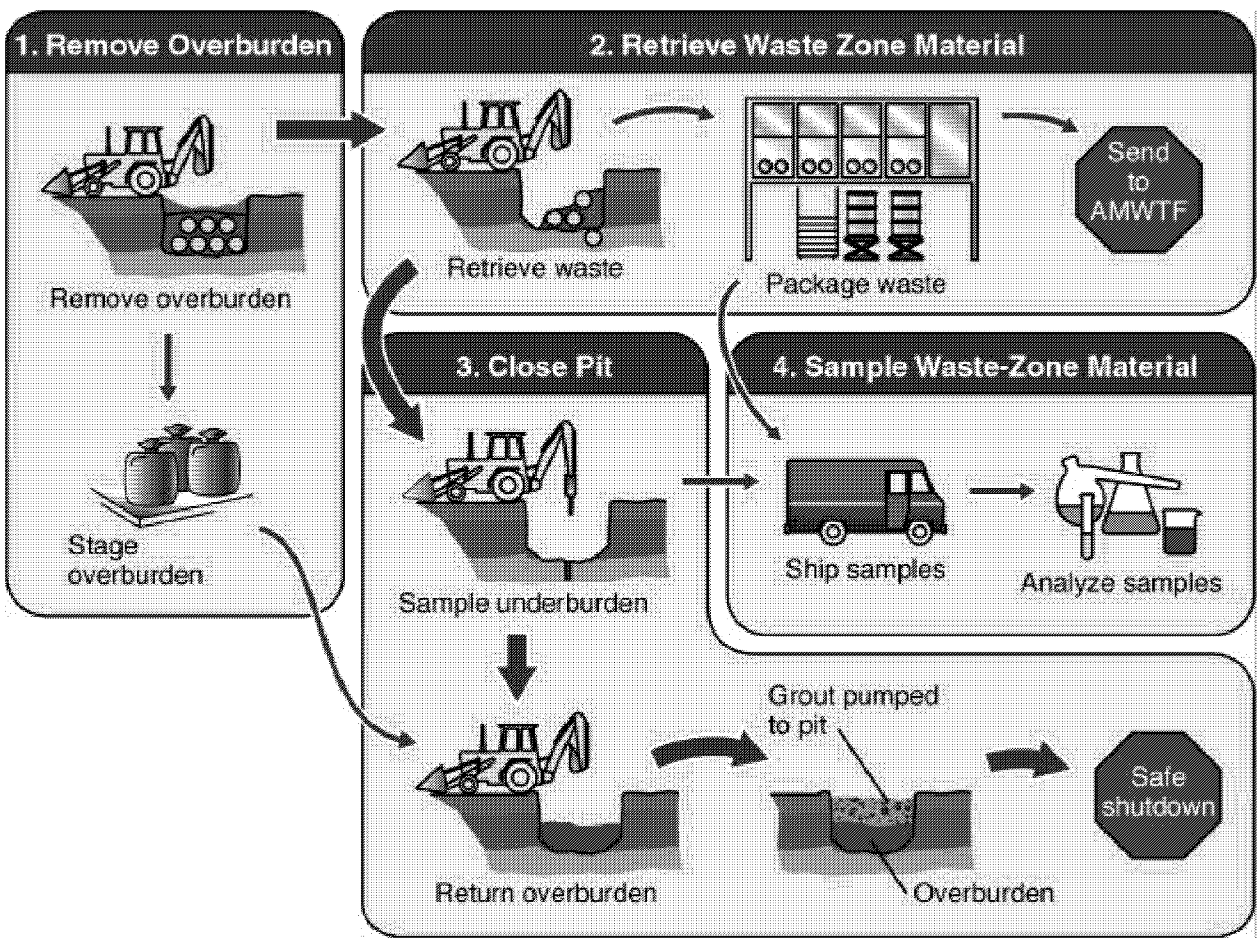

Figure 3-2. The process obtains the required data and concludes with disposing of generated waste zone material and safely shutting down the facility.

Table 3-1. The process retrieves waste zone material, resulting in 300 to 400 55-gal drums based on the inventory for Rocky Flats waste in this area of Pit 9.

	Estimated Quantity of Material Retrieved[a]	Estimated Quantities in Packaged Form	Sampling Requirements
Overburden	70 yds^3	40 Soil sacks	None required
Waste zone material, including 741 sludge (1 drum) 742 sludge (1 drum) 743 sludge (50–80 drums) 744 sludge (1 drum) 745 sludge (8 drums) Combustible (40–60 drums) Noncombustible (5 drums) Graphite (5 drums) Empty (80–120 drums)	75–125 yds	• 300–400 drums of waste zone material • 40–60 overpacks of drum remnants • 10–15 special case bags	• Samples TBD; 80% confidence • None required • As needed
Underburden	N/A	N/A	8 samples

a. Based on a 45- to 60-degree angle of repose.

The following subsections discuss these processes in more detail. Additionally, data collection strategy and process modeling work are presented.

3.1.1 Overburden Removal

Overburden soil, which was placed over the waste zone material as an environmental protection barrier, has to be removed to reach the waste zone material. Overburden removal includes all activities to retrieve, package, and temporarily store overburden soil, and subsequently return it to the pit. Figure 3-3 provides a summary of overburden removal.

Overburden is removed using the manned excavator, with additional personnel inside the confinement structure to assist with packaging. Based on probing data, overburden is retrieved to a depth of 3.5 ft, unless:

- The hard-pack zone of overburden is encountered, which generally corresponds with the top of the waste zone
- Waste zone material is encountered before reaching the 3.5-ft depth
- Contamination that exceeds operating limits is encountered.

Overburden Removal Highlights

- Removed using excavator
- Packaged “hands-on” in 4 x 4-ft soil sacks
- Characterized based on records and Lockheed Martin Advanced Environmental Systems (LMAES) sample data; additional characterization of overburden not needed for disposition
- Returned to pit at end of waste zone material retrieval and sampling

If any of these conditions is encountered, the condition is mitigated and overburden retrieval continues. A hold point exists during all excavation activities. If uncontained free liquid is encountered, excavation activities cease until absorbent is added and free liquid is solidified.

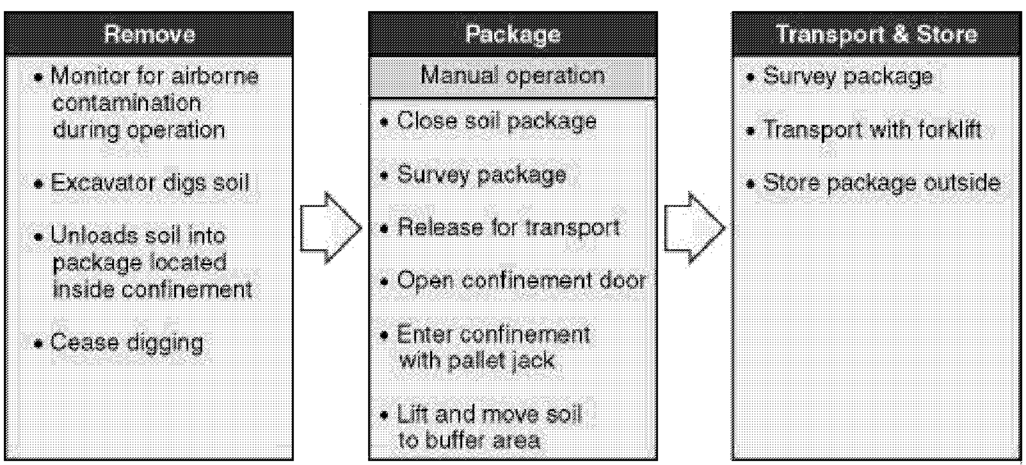

Figure 3-3. A manual process simplifies the overburden removal and packaging operations.

Excavated soil is packaged into 4 × 4 × 4-ft pliable fabric sacks, which are brought to the digface for filling. The filled sacks are moved out of the primary confinement by pallet jack and out of the weather enclosure by forklift, then they are staged outside, near Pit 9. No grading or flooring is required for the overburden storage area. Approximately 70 cubic yards of overburden soil must be removed. This volume of soil, uncompacted by the excavation process, will fill approximately 40 soil sacks.

Personnel entering the confinement area use anticontamination suits and respirators, unless or until sampling or monitoring indicates that higher levels of protection are required.

3.1.2 Waste Process

Once the overburden soil has been removed to a depth of 3.5 ft, waste zone material retrieval begins. Figure 3-4 provides an overview of the waste zone material retrieval process. Detailed process flow charts can be found in Appendix D.

Waste zone material retrieval includes all activities to retrieve, package, and temporarily store waste zone material retrieved from the pit. If uncontained free liquid is encountered, excavation activities cease until absorbent is added and free liquid is solidified.

Approximately 230 waste zone material drums are assumed buried within the area of interest, along with approximately 30 cubic yards of interstitial soil. Therefore, from 75 to 125 cubic yards of waste zone material and interstitial soil will be removed from the pit. Retrieval and packaging of this waste zone material and interstitial soil results in approximately 350 waste zone material drums (55-gal), 50 overpack drums (85-gal), and 12 bagged outlier waste zone material objects.

Waste Process Highlights

- Waste retrieved under local contamination control
- Uncontained free liquids solidified in the excavation when encountered
- Waste packaging managed to prevent overloading fissile content
- Drum remnants or oversized debris packaged in 85-gal drums
- Waste batches sampled and characterized for AMWTP acceptance
- Waste drums assayed for fissile and TRU content

Sixteen probes installed in the excavation area interfere with retrieval operations. The current strategy is to leave the probes in place during overburden retrieval to prevent contamination spread. During waste zone material retrieval, material around each probe will be excavated. If required, some probes may be moved, after material surrounding them has been removed, and staged in the excavation area for reburial in the pit during backfill. Further detail about probe removal is scheduled for Title design.

The project does not have a commitment to specific XYZ traceability, as did the previous 90% Stage II design. However, the current project approach is to have the operators make written record of the relative horizontal location (±1 yd), as well as the relative vertical location of the excavator scoop being taken. The value of this information at lower excavation elevations may be quite limited, due to material sloughing off the sidewalls into the bottom of the excavation, as influenced by the natural angle of repose of the material. Horizontal bucket travel during load movement will also spread waste from one location to another. Grid markings on the shoring box may be used to facilitate this activity. The process detail for these activities will be developed during Title design.

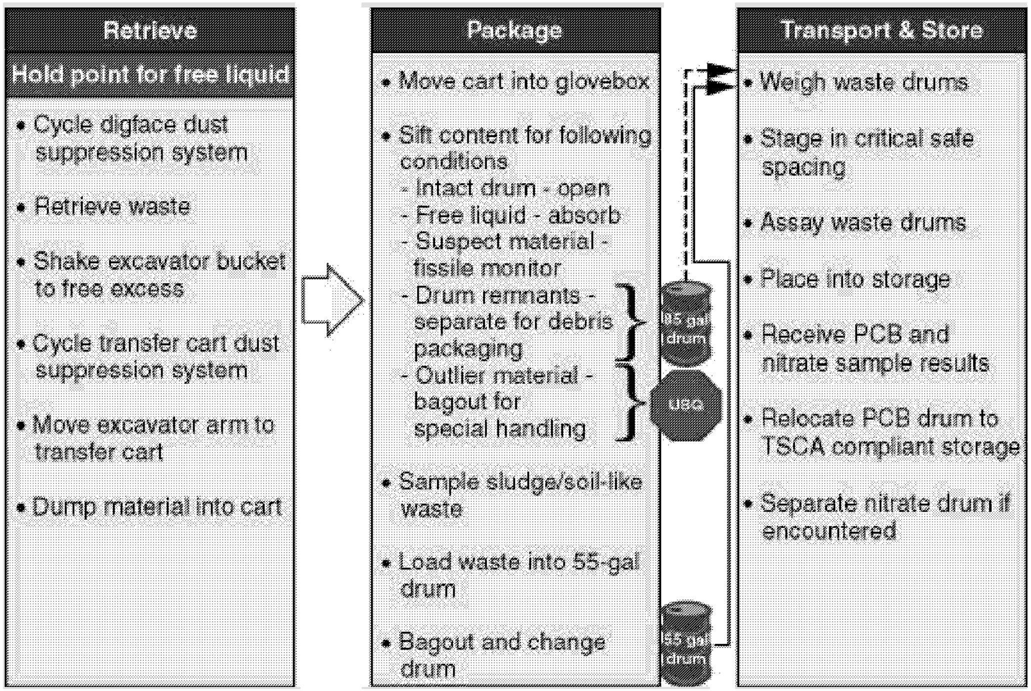

Figure 3-4. Waste zone material retrieval controls contamination, and material is packaged for safe storage.

The dust suppression system discharges a fine water mist before to excavation, at the location of impending retrieval, to reduce dust generation and reduce the spread of contamination. The waste zone material is then removed using the manned excavator and placed into a transfer unit, such as a cart, with a tarpaulin-like liner. The transfer unit is moved into the glovebox, where the contents are segregated, sampled, and packaged.

Materials are segregated based on multiple requirements into several categories:

- Metal, such as drum remnants and noncombustible debris, is segregated for AMWTF benefit. The waste stream can be size reduced in one of their process lines. This waste stream is also packaged into 85-gal drums to eliminate the need to size reduce remnants to fit into 55-gal drums.

- Outlier items are segregated because they are prohibited by WIPP and therefore do not meet the AMWTF waste acceptance criteria. These items are not expected in the excavation area based on shipping records and are outside normal operating procedures. Outlier items are bagged out of the glovebox, or drummed out if too large for bagging, so normal operation in the glovebox can continue. The ultimate disposition plan for these items may include returning them to the pit. Instead of developing numerous procedures for potential items which may not be encountered, abnormal procedures will be developed as needed. The Unreviewed Safety Question (USQ) process is used as required to complete special case handling. This would include items such as pyrophoric material, aerosol cans, lab packs, and high radiation sources.

- Unidentifiable combustible material is segregated to verify fissile content prior to packaging. This group of material is targeted out of concern the material might contain filter media. Filter media can potentially contain significant quantities of fissile material. To prevent overloading a drum above fissile mass limits, any material suspect of containing filter media will be monitored prior to packaging.

- Uncontained visible liquid while not segregated is handled uniquely. The liquid is sampled prior to absorbent being added. The absorbed liquid is then handled and packaged with the remaining soil/sludge i.e. regular waste stream.

As required, samples of the waste zone material are collected in the glovebox. Once all items are segregated, the rest of the waste zone material is carefully lifted out of the transfer unit by using the cart liner and set into a 55-gal drum at a drum port.

Both 55- and 85-gal drums have a hard polyethylene liner and a bag. The liner is placed inside the bag to protect the bag against puncture. The bag is attached to the drum-port to maintain confinement. See Figure 3-5. The drums are located inside a contamination buffer area (not shown in figure). Bag sealing is performed in this buffer area for protection against a breached bag. Once a drum is full, the drum-port opening is covered, and the drum is lowered away from the port. The bag liner is still attached to the port, maintaining confinement for the drum contents. The bag liner is then twisted and sealed in two places, and then cut between the two seals. (The bag liner remnant, attached to the port, goes into the next drum.) A lid is placed on the drum, and the drum is surveyed for contamination. The drum and the interior of the buffer area are decontaminated if needed.

The drum is transported with a forklift. It is first taken to a scale for weighing. Then drums are taken to an assay station. After assay, they are taken to the storage area. After sample analysis results become available, drums containing reactives are segregated. Any drums containing polychlorinated biphenyls (PCBs) are placed in a cargo container.

Detailed process flow charts can be found in Appendix D.

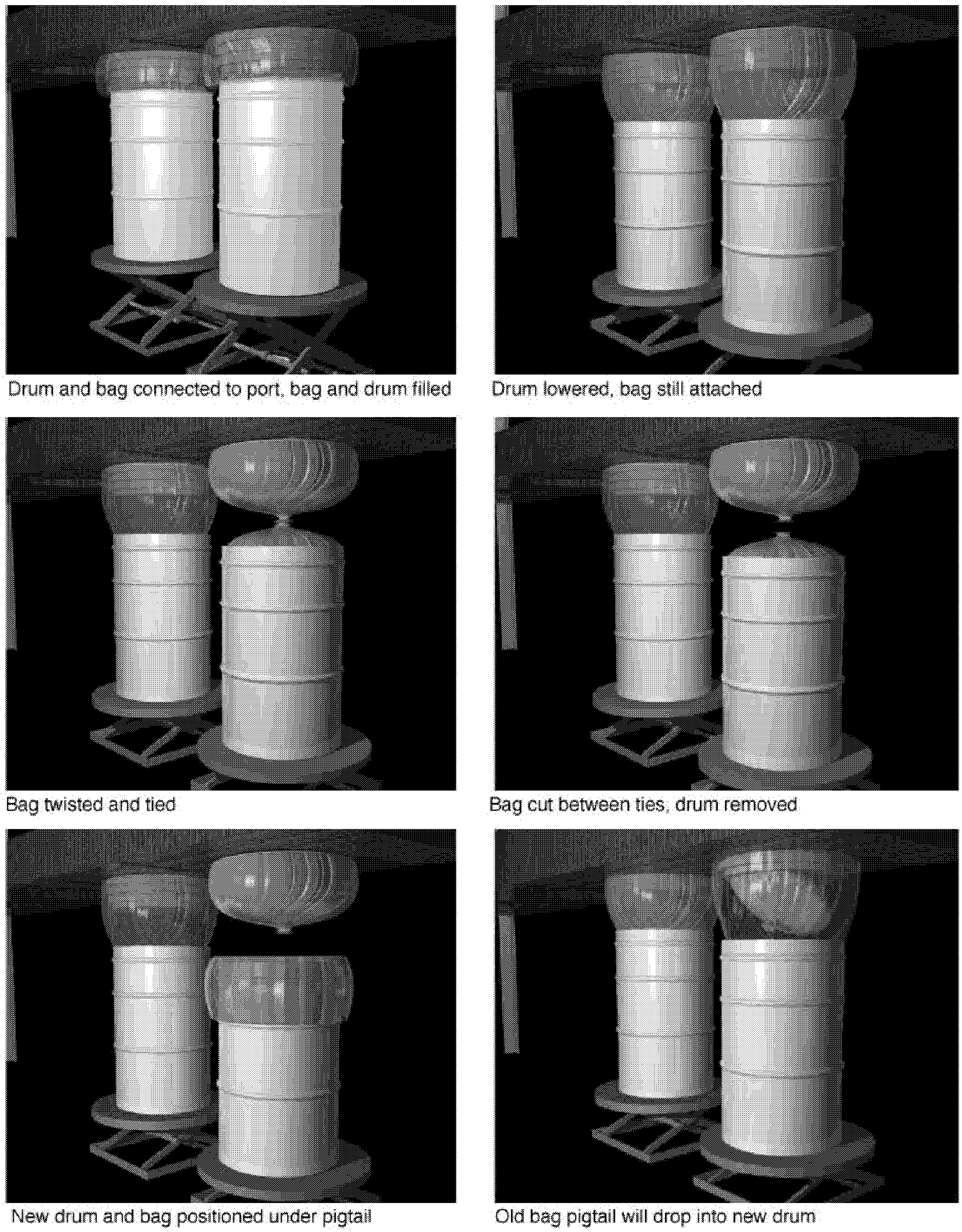

Figure 3-5. Drums are exchanged without breaching confinement.

3.1.3 Sampling

> **Sampling Highlights**
>
> - Waste zone material and underburden sampled
> - Samples stored, shipped, and analyzed in compliance with CERCLA guidelines
> - Samples analyzed at a WIPP-certified laboratory
> - Samples analyzed to obtain data identified in DQOs, including TRU, COCs, and PCBs
> - Samples disposed of as labpack to AMWTF

The sampling process for the Glovebox Excavator Method demonstration involves field sampling activities necessary to meet the established DQOs, as discussed in Section 2.3. Sampling and analysis of waste zone material is performed to support characterization for acceptance to the AMWTF. If free liquid from the waste zone material is encountered in the glovebox, it is sampled before absorbing to characterize PCB concentrations and to ensure safe storage of the retrieved waste zone material. After samples are collected, drums are packaged and placed into storage without waiting for analysis. For PCBs, drums can be stored up to 30 days pending analysis results. When sample analysis results become available, incompatible drums are segregated. Drums containing PCB are placed into TSCA compliant storage. Underburden soil samples are collected to determine the presence of contaminants. Overburden is not sampled, as this material is returned to the pit following excavation of the waste zone material.

To meet waste zone material sampling objectives, random composite samples of non-debris, waste zone material (soil and sludge) are collected from the transfer cart in the glovebox. The project team determines the number of samples to statistically characterize the waste stream as a single population with a confidence interval of 80% consistent with guidance from SW-846. Sufficient quantity of retrieved waste zone material is collected to obtain a 125-mL sample as necessary for the required analysis. In addition, liquids from the waste zone material that are encountered in the gloveboxes are sampled. After excavation of the waste zone material, eight core samples of underburden soil are collected, targeting visibly stained soils, to obtain migration information about COC. If visibly stained soils cannot be identified, a random approach to site selection is taken, whereby randomly selected grid locations are used for sampling.

Table 3-2 summarizes of the required sample analyses necessary to meet the DQOs. In addition to the waste zone material, liquid, and underburden samples, quality assurance/quality control (QA/QC) samples are collected to satisfy the QA requirements for the field operation, per the Quality Assurance Project Plan (QAPjP) for Waste Area Groups 1, 2, 3, 4, 5, 6, 7, 10, and Inactive Sites.

Collected samples are packaged in accordance with the American Society for Testing and Materials or EPA-recommended procedures. Sample labels are completed in the field and placed on the sample containers before sample collection. Information such as the sample identification number, project name, sample location, analysis type, date, time, preservative used, field measurements of hazards, and the sampler's initials is recorded during the field sampling activities. Samples are assigned a systematic, unique, sample identification code linked to the drum bar code label identification in the record system.

Table 3-2. Waste zone material and underburden samples undergo different analyses for different purposes.

Waste Zone Material Nondebris (soil and sludge)	Underburden	Liquid (encountered in glovebox)
Analyses for AMWTF Acceptance	**Contaminant Migration Analyses**	**Analyses for AMWTF Acceptance**
VOCs	VOCs	PCBs (chemical analysis)
SVOC	SVOCs	**Safe Storage**
CLP metal	CLP metal	pH
PCBs (screening test)	PCBs (chemical analysis)	Ignitability
Reactive Cyanide	Am-241	
	Np-237	
	Pu isotopes	
	U isotopes	
	Gamma emitting isotopes	

Once samples are collected, they are stored in a secured area, accessible only to the field team members, until they are shipped for analysis. Sample preservation and holding times are in accordance with the requirements set forth in the QAPjP. Sample integrity is maintained by storing the samples in an on-site refrigeration unit until samples are shipped to the laboratory for subsampling and analysis.

Samples are packaged for shipment per the requirements in MCP-244 "Chain-of-Custody, Sample Handling and Packaging," and the QAPjP. Custody seals will be affixed to all containers in such a way as to ensure that sample integrity is not compromised by tampering or unauthorized opening of sample containers.

Prior to shipment, a request for shipment is completed and information from the non-destructive assay (NDA) (e.g., isotopic activities), and sample weights are provided to the shipping department, to ensure shipping fissile limits are not exceeded. Samples are shipped by vehicle in accordance with the regulations issued by the Department of Transportation (49 CFR Parts 171 through 178) and EPA sample handling, packaging, and shipping methods (40 CFR 261.C.3C.3). Sample integrity is maintained during shipping by using blue ice and coolers.

On-site analytical laboratories at Idaho Nuclear Technology and Engineering Center (INTEC) or outside laboratories will be used for analysis of the waste zone material, liquid, and underburden samples. INTEC analytical facilities or outside laboratory facilities will be approved by the Sample Management Office (SMO), are WIPP-certified (a requirement for AMWTF characterization for ultimate WIPP disposal), and are capable of meeting characterization needs to meet the objectives of the DQOs.

Depending on sample material quantity and type, the analytical laboratory may return unaltered sample material. Management of this waste zone material consists of safe and compliant storage with the retrieved waste zone material until further disposition. Samples are packaged and managed as labpacks, in accordance with RCRA labpack requirements (40 CFR 264.316). The labpacks are stored with the waste zone material drums and subject to the same storage requirements and disposition.

3.1.4 Data Management

The glovebox excavator project must maintain data records of each waste zone material drum, and a simple data management strategy supports this requirement.

The data files consist of paper forms for each drum. This simple, low-technology approach eliminates the cost of developing and using an electronic database for this short campaign and limited number of drums. Should information be needed, each drum data file can be quickly retrieved from a designated storage area. With the limited number of drums generated, any subsequent reporting can be managed from the paper files. If an automated data management system is required in the future, the paper file information can be entered.

Data Management

- Characterization data is recorded with paper and pen
- Drum and sample label simplified to a alpha-numeric barcode
- Facility monitoring and project data maintained using existing INEEL processes
- Air emissions monitored and logged

Collecting data pertinent to the glovebox excavator method process is the initial effort. Figure 3-6 shows the data collected. When operators at the gloveboxes receive waste zone material from the pit, they handle and inspect the waste zone material, during which they also characterize the waste zone material. Characterization includes a physical description of the waste zone material, and the description is recorded on a paper form. Also, during characterization, a waste zone material sample is taken and, after initial storage, is sent to a laboratory for analysis.

Once the waste zone material drum has been sealed, a forklift operator transfers the drum to a weighing scale in the WES. The weight is entered on the characterization form. The operator then transfers the drum from the WES to a drum assay trailer, where the fissile content of each drum is measured. The drum assay form is attached to the characterization form.

When the operator removes the drum from the assay trailer, he places it in the interim storage shelter. The drum location in the storage shelter is noted and added to the waste zone material drum data file. When the sample analysis result is obtained, it is included in the waste zone material drum data file.

A barcode system is used to identify drums, samples, and paper forms. The barcodes on drums and samples can be quickly scanned and identified, thus minimizing exposure during handling operations. Again, should an automated data management system be required in the future, the barcode system will readily support an automated system.

Data about retrieval building emissions must also be processed. The emissions monitor measures the radiological contamination content of the retrieval building exhaust. High-efficiency particulate air (HEPA) filters in the exhaust remove contamination, but, in the unlikely event of a filter failure, contamination could be released to the environment. To mitigate the effects of such a failure, the emissions monitor detects unacceptable contamination levels and initiates an alarm. Operators and radiological technicians then take appropriate steps to control the contamination. The emissions monitor not only initiates an alarm under unacceptable conditions, it also logs emission data to comply with regulatory codes and standards. Based on preliminary emissions estimates for the glovebox excavator method design, in comparison to the relevant State of Idaho toxic air pollutant standards, mercury and volatile organic compound (VOC) monitoring is not required.

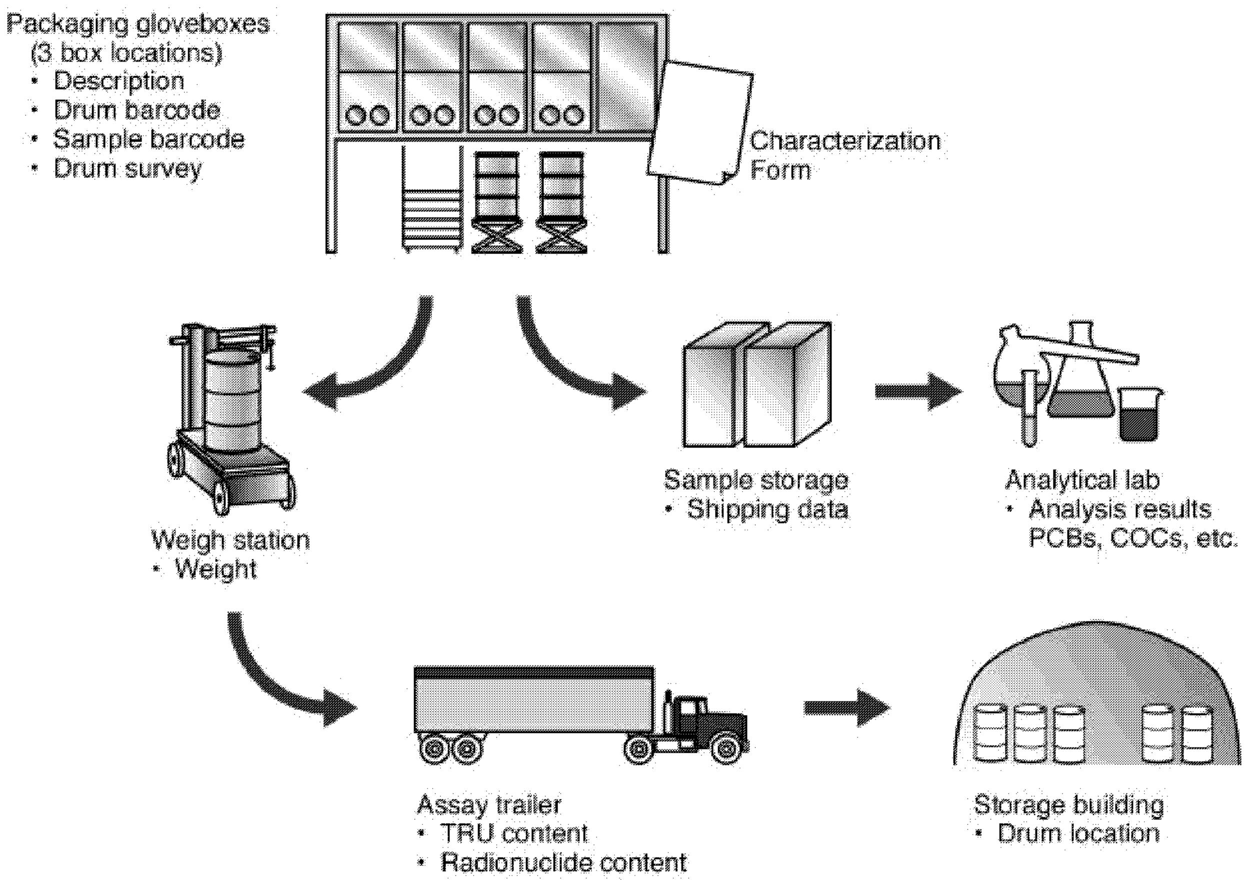

Figure 3-6. Data generation points are obtained at numerous locations.

3.1.5 Process Modeling

A dynamic, discrete event model has been developed to simulate the operations process.

The model is a highly valuable predictive tool that provides insights and answers that otherwise would not be available until after the system is built and operations are underway. It provides a solid, reliable basis for estimating the operational schedule. At the conceptual design phase, the model indicates that operations will take approximately 3-1/2 months. As the design and the process are refined, the model will be modified accordingly to provide an updated schedule estimate and to assess design change schedule impacts.

The model also helps in evaluating scenario changes and process changes, and in performing trade-off analyses. For example, a simple trade study has already been performed to evaluate the impacts of using two versus three gloveboxes. The model provided the schedule impact, which was used to price the cost impact. Due to combinations of serial and parallel activities and interactive interdependencies, the impacts of such process or equipment changes are not always intuitive.

The model contains material flow paths and associated process handling tasks. Durations for each task are defined. The model accepts overburden soil and waste zone material drum quantities as inputs and runs the materials in discrete batches through the appropriate waste stream process paths. Activities can be designated as being accomplished in serial or parallel, providing a more realistic and accurate schedule estimate.

The model is animated to enhance process and material flow visualization and understanding. A screen shot of the model is shown in Figure 3-7. The process flow and model will be used to develop operating production schedules that feed the plan of the week and plan of the day for facility operations.

3.1.6 Closure Process

After retrieval operations are complete, the excavation area, facilities, and equipment will be placed in a safe configuration and shut down. Pit closure allows the facility to maintain contamination control, facility surveillance, and maintenance requirements until deactivation, decontamination, and dismantlement (DD&D) activities start. Figure 3-8 provides an overview of the pit closure process.

Pit closure is divided into three subprocesses:

- Post-retrieval activities
- Backfilling the pit void
- Placing the facility in a safe shutdown condition.

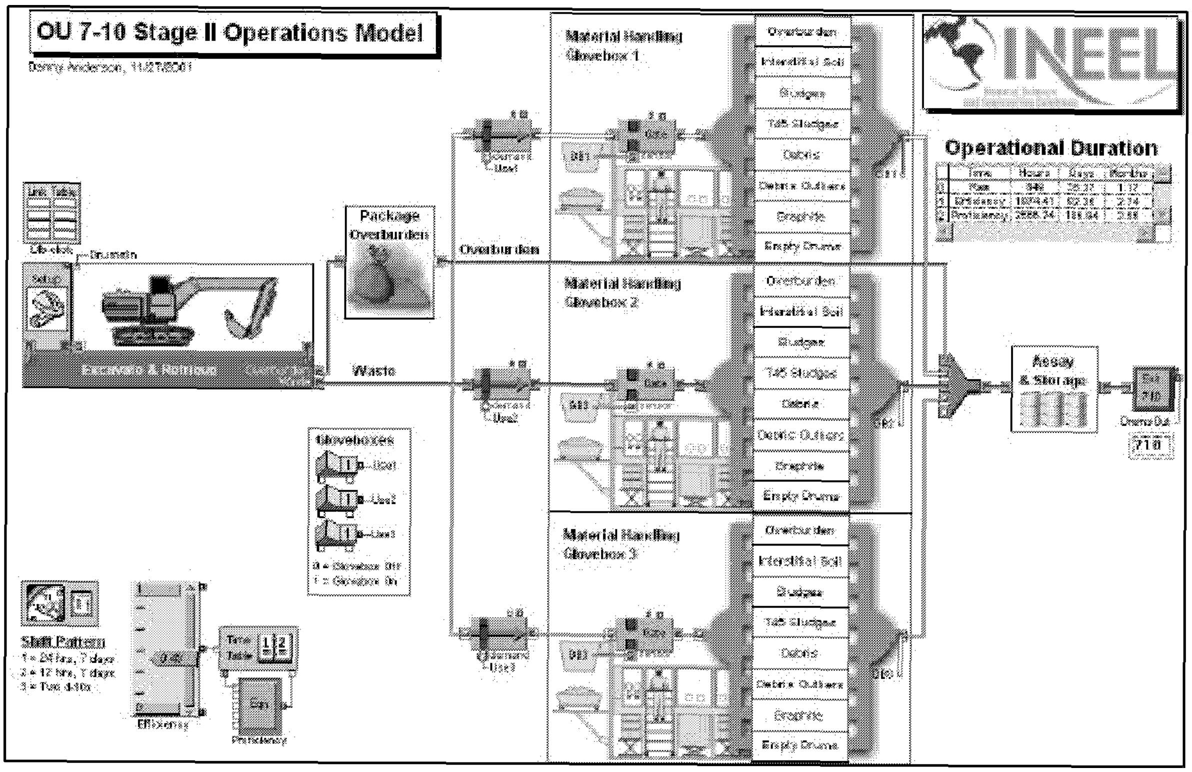

Figure 3-7. Operations process model screenshot.

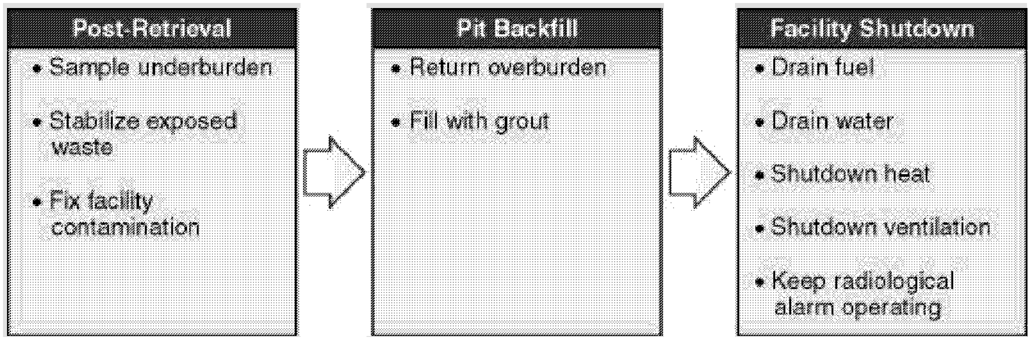

Figure 3-8. Pit closure process—the project concludes with facilities left in a safe condition.

To provide data about the contamination levels in the pit underburden, core samples of the underburden are taken after excavation operations are complete (see Section 3.1.3 for sampling). These samples are taken by the excavator using a sampling tool end-effector. The samples are packaged in the PGS, then sent for analysis.

After sampling, any loose material in the RCS is returned to the pit, then a soil fixative is manually sprayed over the excavation area to prevent further contamination spread within the RCS during shutdown efforts. With contamination fixed in the pit, the confinement structure, excluding windows and internal equipment are sprayed with paint. The remaining items are then decontaminated. Since the excavator must be used during pit backfill, a combination of painting and decontamination of the arm is performed. Proper personal protective equipment (PPE) is required for operations personnel to enter the RCS. The gloveboxes may be sealed off, decontaminated, or sprayed, depending on decontamination and decommissioning needs.

Due to the size and complexity of the structures and equipment, this method of fixing contamination improves on the practice of using wipes to remove contamination. Workers receive less radiological exposure, less secondary waste zone material is produced, and difficult to reach areas are more easily controlled. This operation is performed manually to ensure proper application.

After contamination in the facility is fixed, the overburden is returned to the pit. The overburden, which was stored in sacks, is returned to the RCS on pallets and placed near the pit in a laydown area. The excavator pushes the sacks back into the pit. To control any excessive dust, the misting system is used as the excavator tears the bags open and distributes the clean overburden soil in the pit. The sacks remain in the pit.

A slurry of clean soil and grout is pumped into the pit to approximately 6 inches from grade. This additional layer of clean material further protects the environment and personnel from the previously exposed waste zone material. The soil-grout mixture will not solidify into a monolith, preventing future subsidence and allowing for placement of the final layer of compacted topsoil.

The pit is not completely filled, to allow for DD&D. Final backfill with topsoil will be completed after DD&D.

Any equipment in the WES considered salvageable but not needed for protection after closure is then surveyed, decontaminated if necessary, and released. This allows equipment such as the excavator vehicle, water tanks, and forklifts to be reused.

Remaining equipment is placed in a stable configuration with fluids removed. The ventilation system may remain operational until the facility is turned over to DD&D. The radiation monitors are left operating, which will ensure any changes in radiological conditions are detected.

DD&D will start with the facility in this passive safe condition. During DD&D, above grade structures and equipment will be removed and dispositioned (disposal or re-use as appropriate), contaminated items will be dismantled and disposed of, and the grout surface of the pit will be covered with soil back to grade and replanted. As the pit was filled with overburden and grout during shutdown, no contaminated items are expected to be disposed of in the pit except the overburden trench box which will remain in place. Existing Type A probes will be left in the excavation.

3.2 Site Development

The Site Development Package provides access to the site for both construction and operational activities. The project site and adjacent construction areas are to be filled with pit-run gravel to accommodate the roads, structures, and equipment required to perform the excavation and associated operations.

The roads and pads will be graded to direct any drainage into the existing RWMC drainage systems.

The Site Development Package prepares the work site by:

- Upgrading roads, ramps, and parking areas with gravel
- Preparing graveled pads for structures
- Upgrading and protecting the existing storm water drainage system
- Preparing needed utility systems.

3.2.1 Site Location

The project site is located on the northeast corner of the Subsurface Disposal Area (SDA) in the southwest end the of Pit 9 area, immediately west of the RWMC Operations area at the INEEL (see Figure 3-9). The site coordinates are 40 to 80 ft north and 0 to 40 ft east of the Pit 9 southwest monument. The coordinate axes align with the boundary line running between the northwest and southwest monuments, and represent a local set of axes that have no direct relationship with a true or magnetic north bearing.

The area just to the west of Pit 9, which includes structures currently owned by LMAES, is used for roads, staging of buildings and equipment, and work area operations.

3.2.2 Description of Existing Site

Pit 9 comprises a 115 × 400-ft portion of the SDA, and consists of a waste pit situated between two concrete structural pads (see Figure 3-10). The pit is covered with an average of 4 ft of overburden.

Existing Probes, Structures, and Facilities. The existing probes are described in Subsection 3.2.3 and illustrated in Figure 3-12.

The existing main structures located in the Pit 9 area are the process building, retrieval building, and rail system supported by the concrete structural pads (see Figure 3-10). These structures are being retained and protected during project operations, but minor modifications to the rail system slabs are necessary to accommodate an access ramp to the WES from the west side of the rail structure. Several small existing trailer-type structures will be moved before the project begins.

Also located in the project area are two storm water catch basins connected to an underground piping system (the storm water collected in this system dumps into the detention basin), a storm water collection system for the SDA (the collected water is directed through the system around the west and south sides of the process building into the detention basin), and an inactive underground fire water system (see Figure 3-10).

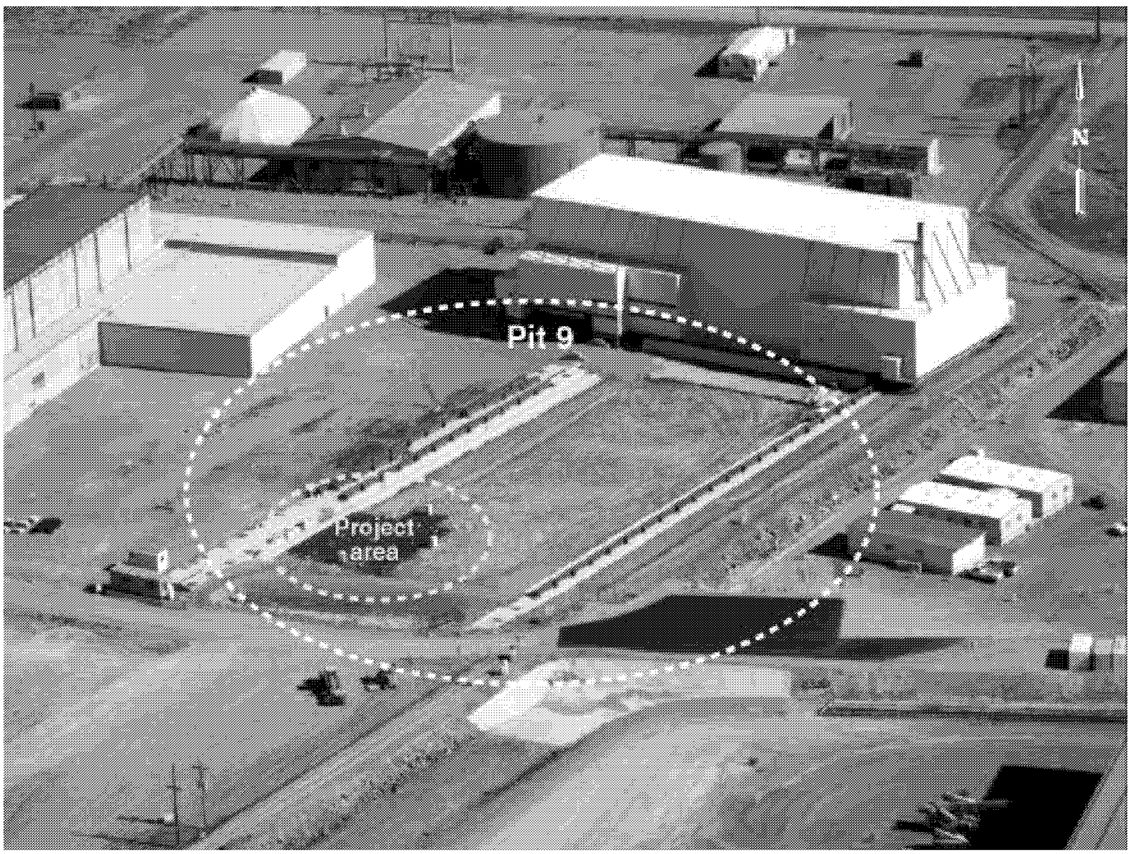

Figure 3-9. Pit 9 project site.

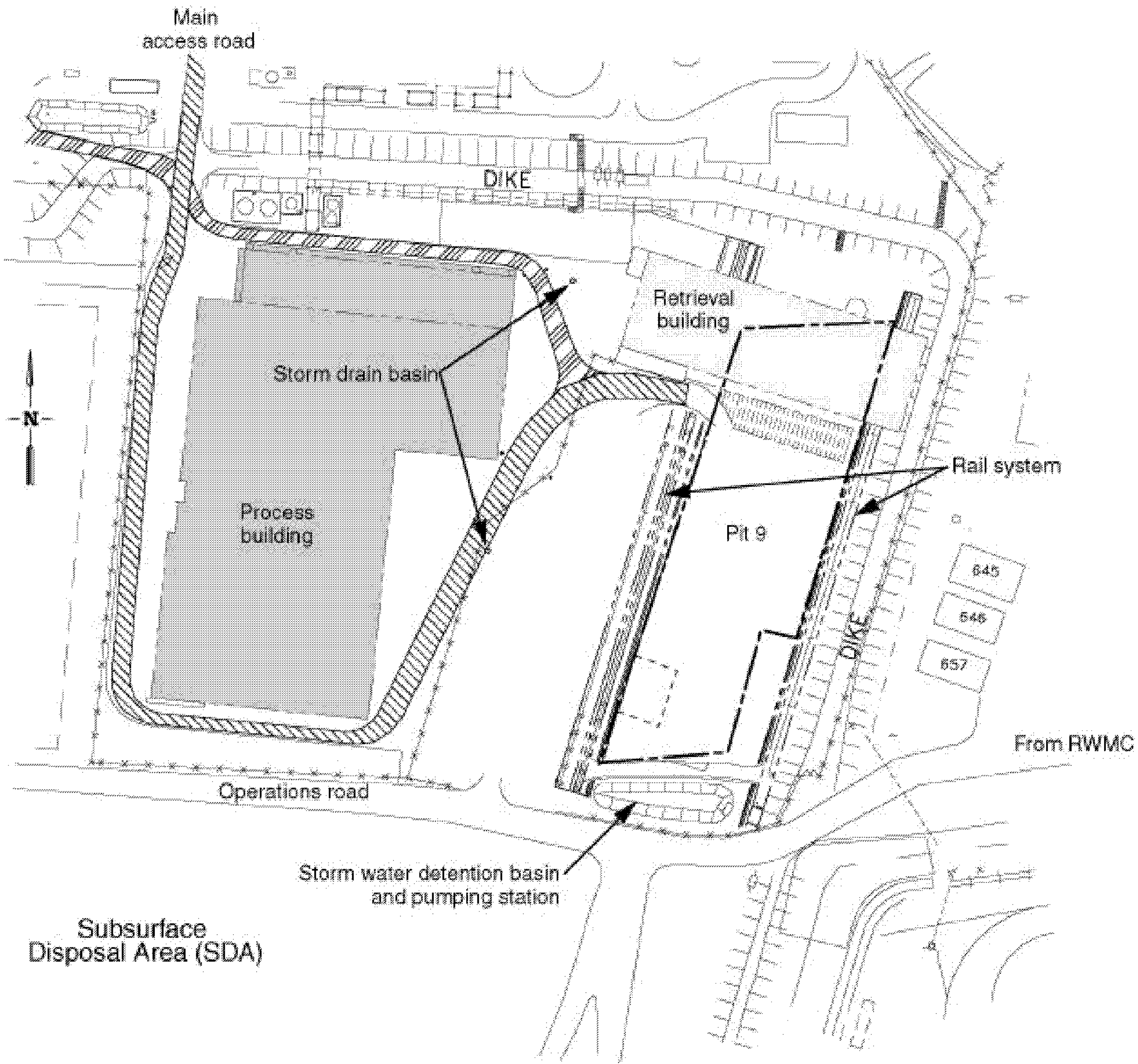

Figure 3-10. Plot plan of the existing Pit 9 area showing infrastructure.

Existing RWMC Roads. The main access road to the project area for construction purposes is Madison Ave., which enters Pit 9 from the north (see Figure 3-10). A small dike is crossed by the main access road from the LMAES construction laydown area to the Pit 9 area. The roads north of this dike are in good condition and will accommodate construction traffic; the roads south of the dike are basically at the same elevation as the surrounding ground.

When project operations are in progress, operations personnel will access the site by way of an existing RWMC road that enters the site to the south of Pit 9 (see Figure 3-10). This road is currently in good condition and no additional construction is required.

SDA Storm Water Drainage and Control. The only source of storm water for the SDA and Pit 9 areas is atmospheric precipitation in the form of rain and snow. This water must be controlled to prevent flooding of the Pit 9 area.

Localized runoff from within the SDA is safely controlled through an existing engineered internal drainage system. Surface water runoff within the interior of the SDA discharges to the main drainage channel along Adams Boulevard through a storm water detention basin located on the east end of the SDA (see Figure 3-11). The storm water detention basin was constructed to collect internal runoff from within the SDA for sampling before discharge to the main channel. The storm water detention basin is equipped with a sump pump and two 30-in. culverts. The sump pump, rated at 6-hp and 400-gal/minute pumps the detained storm water from the detention basin through a 4 in. discharge pipe into one of the two 30-in. culverts and then into the main channel. The detention basin has a storage capacity of 70,400 ft^3. Storm water will be detained in the basin to allow sediments in the water to settle out, and radionuclide sampling of the sediments in the collected water before it is pumped from the detention basin into the main channel. In overflow flood conditions, the culverts can handle up to 56 ft^3/second when the pipe outlet is submerged, and 66 ft^3/second when there is free flow to the channel.

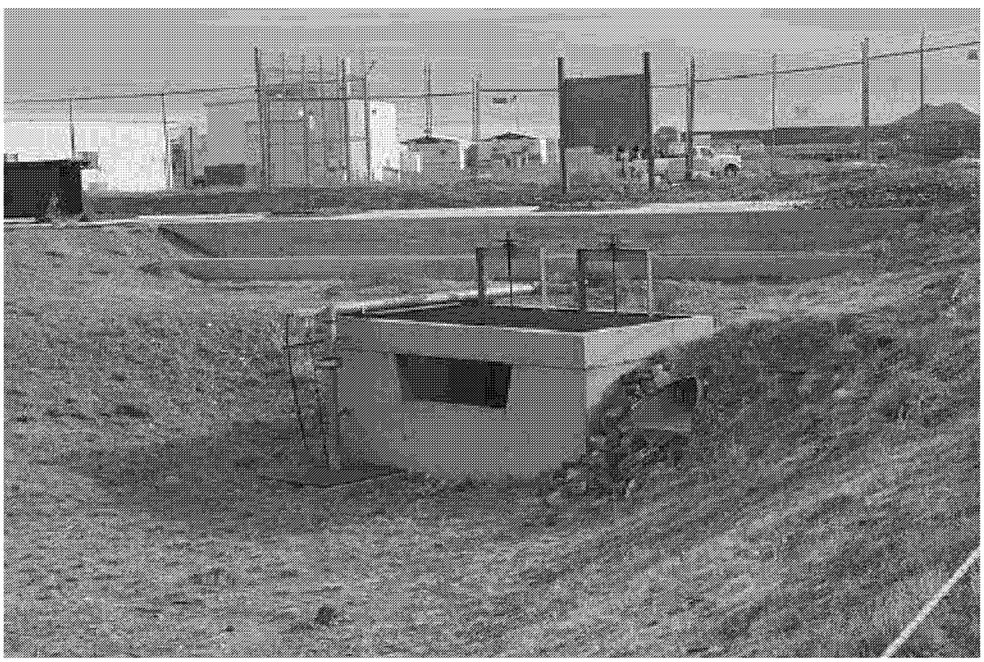

Figure 3-11. Storm water detention basin with pumping station.

3.2.3 Description of New Site Development and Utilities

New Roads, Ramps, and Parking Areas. A new road will be constructed around the LMAES Process Building to the Pit 9 area of compacted pit-run gravel obtained from the Borax pit approximately 1 mile east of the RWMC. The design calls for graveled rather than paved roads due to the short design life and the schedule for operations during the spring and summer months. A short compacted access road will be constructed from the main access across a berm over the pile cap and rail system. This road will run east next to the Retrieval Building and then turn south across Pit 9 to the WES (see Figure 3-12). There will be a turnaround provided so that flat-bed trucks can turn around and back into the north end of

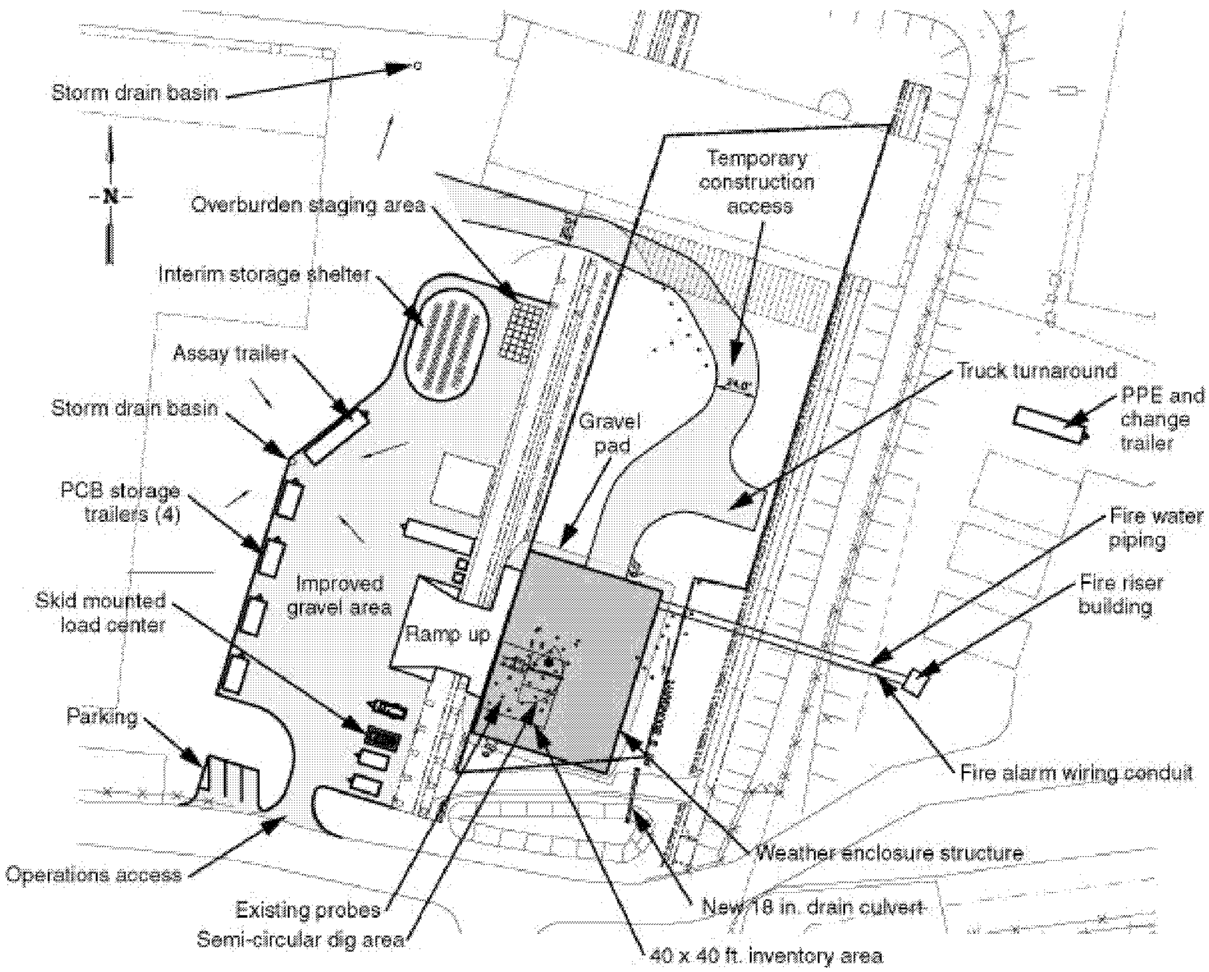

Figure 3-12. Plot plan of Pit 9 area showing project site improvements.

the WES through a temporary opening. This will make it possible to deliver equipment into the WES for both the RCS and PGS.

A ramp is planned that will provide operational access to the WES from the construction area (see Figure 3-12). This ramp is required so that vehicles can travel over the concrete rail structure. Existing steel rail sections are to be removed from the concrete structures. A small concrete curb is also planned to be removed from the rail structure to accommodate the ramp and provide a smooth access into the WES and RCS.

A small parking area is planned on the southwest corner of the construction area for three van-type vehicles (see Figure 3-12). These vehicles are the transport for operational personnel to the project site.

New Gravel Pads for Structures. A pit-run gravel pad supports the WES and inside structures (see Figure 3-12). This pad varies from 0.5 to 1.5 ft thick, extends 1–2 ft away from the building perimeter, and then slopes to the natural pit surface. Before placing the fill, the surface is covered with a geotextile membrane as an interface between the pit-run gravel fill and the soil overburden cover to prevent possible contamination of the pit-run gravel fill.

Pit-run compacted gravel also supports the assay trailer, interim storage building, the TSCA storage trailers, and other small trailers and skids.

Probes Within the WES Structural Pad Area. A number of observation and sampling probes have been installed throughout Pit 9, but the predominant number are located in the project area (see Figure 3-12). The pit-run gravel pad constructed to support the WES, RCS, and PGS will cover at least 40 of these probes. The gravel fill will be placed over these probes without bending or breaking them. Those that extend above the gravel pad that do not interfere with the excavation will remain in place the for the duration of the project, but will be marked and protected from unintentional damage during construction; the facility floor structure will protect them from contamination during operations. The probes within the excavation (retrieval) area may be moved during excavation.

Gravel Fill, Culverts, and Ditches for Storm Water Drainage. The improved gravel area between the west concrete pad structure and the access road is graded with pit-run gravel to the existing storm drain system. This allows storm water to drain away from the facilities into the catch basins, through the drain system into the detention basin, and eventually into the Adams Blvd. drainage channel.

Pit-run gravel fill is used to grade around the WES so that storm water drains to the south and east of the WES. A new 18-in. corrugated metal pipe is to be installed through the bank of the detention basin to drain the area (Figure 3-12). Other than the above grading, it is anticipated that additional drain ditches are not required.

Fire Riser Building. A fire riser is planned on the fire water line that terminates on the west end of the RWMC operations area just to the north of the SDA access road. A small building is planned to house the fire riser (see Figure 3-12). The building is insulated to protect the riser from freezing.

Connections will be made to the fire riser where dry pipes are to be installed and run above ground to provide fire protection access near the WES. The above-ground piping will be secured with concrete blocks to resist the thrust of the fire water when the lines are in use.

Fire Alarm Lines. The fire alarm service line conduit will run above ground from the fire riser building to the WES facilities (see Figure 3-12).

Electrical Substation Skid. The project includes a portable electrical substation mounted on a skid. The substation is located on the west side of the west concrete slab, southwest of the WES (see Figure 3-12). Power service for this substation is transmitted through above-ground conduit from an overhead power line located to the northwest of the Pit 9/LMAES area and north of the SDA. A minor amount of excavation is needed through the dike berm between the SDA and the LMAES laydown areas for the power conduit. The conduit is located on existing boundary features and secured so that vehicular traffic does not interfere with power service.